U.S. DEPARTMENT OF COMMERCE
National Technical Information Service
PB-278 553

Magic Reservoir, Camas and Blaine Counties, Idaho

National Eutrophication Survey, Las Vegas, Nev

Prepared for

Environmental Monitoring and Support Lab, Las Vegas, Nev

Jul 77

PB 278 553

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL EUTROPHICATION SURVEY

WORKING PAPER SERIES

REPRODUCED BY
NATIONAL TECHNICAL
INFORMATION SERVICE
U. S. DEPARTMENT OF COMMERCE
SPRINGFIELD, VA. 22161

CORVALLIS ENVIRONMENTAL RESEARCH LABORATORY - CORVALLIS, OREGON

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ENVIRONMENTAL MONITORING & SUPPORT LABORATORY - LAS VEGAS, NEVADA

☆G.P.O. 699-440

TECHNICAL REPORT DATA
(Please read Instructions on the reverse before completing)

1. REPORT NO.	2.	3. RECIPIENT'S ACCESSION NO. PB278553
4. TITLE AND SUBTITLE Report on Magic Reservoir, Camas and Blaine Counties, Idaho		5. REPORT DATE Prepared July 1977 6. PERFORMING ORGANIZATION CODE
7. AUTHOR(S) Anonymous (National Eutrophication Survey Staff)		8. PERFORMING ORGANIZATION REPORT NO. Working Paper No. 785
9. PERFORMING ORGANIZATION NAME AND ADDRESS National Eutrophication Survey U.S. Environmental Protection Agency P.O. Box 15027 Las Vegas, NV 89114		10. PROGRAM ELEMENT NO. 11. CONTRACT/GRANT NO.
12. SPONSORING AGENCY NAME AND ADDRESS Office of Research and Development U.S. Environmental Protection Agency 401 M Street, S. W. Washington, DC 20460		13. TYPE OF REPORT AND PERIOD COVERED Final - 1975 14. SPONSORING AGENCY CODE

15. SUPPLEMENTARY NOTES
Prepared in cooperation with the U.S. Environmental Protection Agency, Corvallis Environmental Research Laboratory, Eutrophication Survey Branch, Corvallis, OR 97330

16. ABSTRACT
Annual total phosphorus and total nitrogen loadings to the lake were estimated and subdivided according to either point or non-point source origin. An assessment of the lake's trophic condition and limiting nutrient is also provided. All data collected by the U.S.E.P.A. National Eutrophication Survey during the one year study of the lake and its tributaries are included in the report.

17. KEY WORDS AND DOCUMENT ANALYSIS

a. DESCRIPTORS	b. IDENTIFIERS/OPEN ENDED TERMS	c. COSATI Field/Group
eutrophication lakes nutrients phosphorus nitrogen loading		48G

18. DISTRIBUTION STATEMENT	19. SECURITY CLASS (This Report)	21. NO. OF PAGES
Release unlimited		49
	20. SECURITY CLASS (This page)	22. PRICE PCA03 - A01

EPA Form 2220-1 (9-73)

REPORT
ON
MAGIC RESERVOIR
CAMAS AND BLAINE COUNTIES
IDAHO
EPA REGION X
WORKING PAPER No. 785

WITH THE COOPERATION OF THE
IDAHO DEPARTMENT OF HEALTH AND WELFARE
AND THE
IDAHO NATIONAL GUARD
JULY, 1977

REPORT ON MAGIC RESERVOIR

CAMAS AND BLAINE COUNTIES, IDAHO

EPA REGION X

by

National Eutrophication Survey

Water and Land Quality Branch
Monitoring Operations Division
Environmental Monitoring & Support Laboratory
Las Vegas, Nevada

and

Special Studies Branch
Corvallis Environmental Research Laboratory
Corvallis, Oregon

Working Paper No. 785

OFFICE OF RESEARCH AND DEVELOPMENT
U.S. ENVIRONMENTAL PROTECTION AGENCY

July 1977

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FOREWORD

The National Eutrophication Survey was initiated in 1972 in response to an Administration commitment to investigate the nationwide threat of accelerated eutrophication to freshwater lakes and reservoirs.

OBJECTIVES

The Survey was designed to develop, in conjunction with state environmental agencies, information on nutrient sources, concentrations, and impact on selected freshwater lakes as a basis for formulating comprehensive and coordinated national, regional, and state management practices relating to point source discharge reduction and nonpoint source pollution abatement in lake watersheds.

ANALYTIC APPROACH

The mathematical and statistical procedures selected for the Survey's eutrophication analysis are based on related concepts that:

a. A generalized representation or model relating sources, concentrations, and impacts can be constructed.

b. By applying measurements of relevant parameters associated with lake degradation, the generalized model can be transformed into an operational representation of a lake, its drainage basin, and related nutrients.

c. With such a transformation, an assessment of the potential for eutrophication control can be made.

LAKE ANALYSIS

In this report, the first stage of evaluation of lake and watershed data collected from the study lake and its drainage basin is documented. The report is formatted to provide state environmental agencies with specific information for basin planning [§303(e)], water quality criteria/standards review [§303(c)], clean lakes [§314(a,b)], and water quality monitoring [§106 and §305(b)] activities mandated by the Federal Water Pollution Control Act Amendments of 1972.

Beyond the single lake analysis, broader based correlations between nutrient concentrations (and loading) and trophic condition are being made to advance the rationale and data base for refinement of nutrient water quality criteria for the Nation's freshwater lakes. Likewise, multivariate evaluations for the relationships between land use, nutrient export, and trophic condition, by lake class or use, are being developed to assist in the formulation of planning guidelines and policies by the U.S. Environmental Protection Agency and to augment plans implementation by the states.

ACKNOWLEDGMENTS

The staff of the National Eutrophication Survey (Office of Research and Development, U.S. Environmental Protection Agency) expresses sincere appreciation to the Idaho Department of Health and Welfare for professional involvement, to the Idaho National Guard for conducting the tributary sampling phase of the Survey, and to those Idaho wastewater treatment plant operators who provided effluent samples and flow data.

The staff of the State of Idaho Department of Health and Welfare, Division of Environment, provided invaluable lake documentation and counsel during the Survey, reviewed the preliminary reports and provided critiques most useful in the preparation of this Working Paper Series.

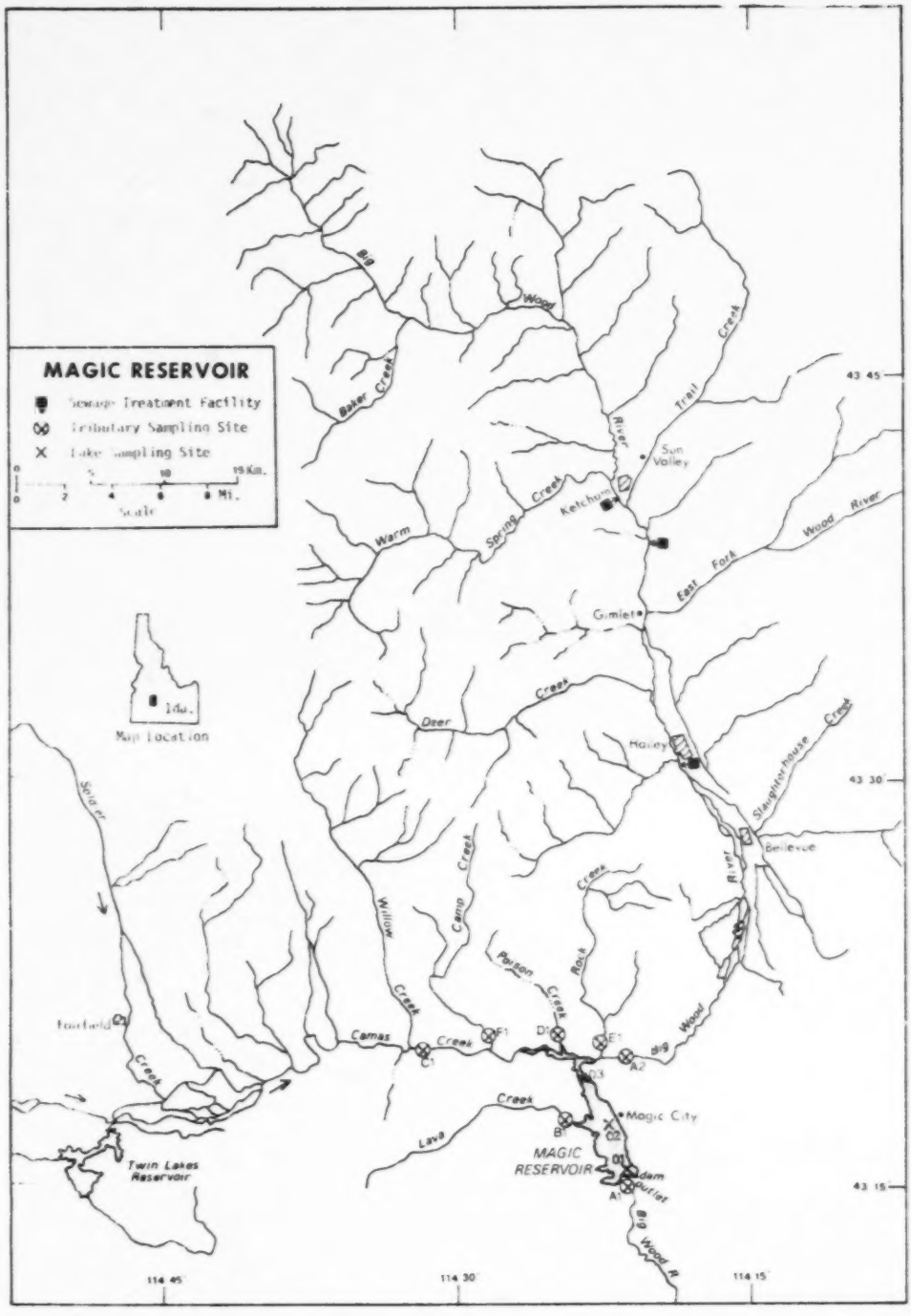
Major General James S. Brooks, Adjutant General of Idaho, and Project Officer Major Vestal L. Baker, who directed the volunteer efforts of the Idaho National Guardsmen, are also gratefully acknowledged for their assistance to the Survey.

NATIONAL EUTROPHICATION SURVEY

STUDY LAKES

STATE OF IDAHO

LAKE NAME	COUNTY
American Falls Reservoir	Bannock, Bingham, Power
Cascade Reservoir	Valley
Coeur d'Alene Lake	Benewah, Kootenai
Dworshak Reservoir	Clearwater
Hauser Lake	Kootenai
Hayden Lake	Kootenai
Island Park Reservoir	Fremont
Lake Lowell (Deer Flat Reservoir)	Canyon
Magic Reservoir	Blaine, Camas
Palisades Reservoir	Bonneville (Lincoln in WY)
Payette Lake	Valley
Lower Twin Lake	Kootenai
Upper Twin Lake	Kootenai


MAGIC RESERVOIR
Sewage Treatment Facility
Tributary Sampling Site
Lake Sampling Site
Scale
Km.
Mi.
Ida.
Map location
Big Wood
Baker Creek
Trail Creek
River
Sun Valley
Ketchum
Warm Spring Creek
East Fork
Wood River
Gimlet
Deer Creek
Hailey
Slaughterhouse Creek
Bellevue
Silver
Willow Creek
Camp Creek
Rock Creek
Big Wood River
Fairfield
Camas Creek
Creek
Magic City
Lava Creek
Twin Lakes Reservoir
MAGIC RESERVOIR
dam
Outlet
Big Wood R.
43 45
43 30
43 15
114 45
114 30
114 15

REPORT ON MAGIC RESERVOIR, IDAHO

STORET NO. 1609

I. CONCLUSIONS

A. Trophic Condition:*

Survey data indicate that Magic Reservoir is eutrophic, i.e., nutrient rich and highly productive. Whether such nutrient enrichment is to be considered beneficial or deleterious is determined by its actual or potential impact upon designated beneficial water uses of each lake.

Chlorophyll a values in the lake ranged from 1.3 µg/l in May to 27.3 µg/l in September with a mean of 7.3 µg/l. Potentials for primary production as measured by algal assay control yields were high. Lake water transparency was generally good in the summer and fall, but low during spring sampling. Of the 15 Idaho lakes sampled in 1975, only 2 had higher median total phosphorus (0.062 mg/l), none had higher median inorganic nitrogen (0.130 mg/l), and 1 had higher median orthophosphorus (0.020 mg/l) levels than Magic Reservoir.

Survey limnologists did not report any problem algal blooms or macrophytes during their visits to the lake. However, other studies (C. Falter, 1973) have reported bloom

*See Appendix E.

conditions in midsummer of several dominant species in the lake, and recommended restriction of nutrient supplies, particularly nitrates, to curtail future summer algal growths.

B. Rate-Limiting Nutrient:

The algal assay results indicate that Magic Reservoir was limited by available phosphorus during spring sampling (05/15/75) and by available nitrogen during the fall (09/17/75). The reservoir data suggest nitrogen limitation at all three sampling times.

C. Nutrient Controllability:

1. Point sources -

During the sampling year, the listed point sources were calculated to contribute 21.5% of the total phosphorus load to Magic Reservoir. The wastewater treatment plant at Ketchum contributed 15.2%, and two other facilities at Hailey and Mountain Meadows Mobile Home Park contributed 5.1% and 1.2%, respectively. However, actual annual contributions to Magic Reservoir from these plants are somewhat less than the calculated values as during May to October much of the Big Wood River is diverted for irrigation at Bellevue. Further investigation is needed to determine what percent of the loadings from the municipal plants discharging to Big Wood River actually reach Magic Reservoir.

The present phosphorus loading of 2.58 g $P/m^2/yr$ is twice that proposed by Vollenweider (1975) as a "eutrophic" loading. The loading data suggest that 90% reduction of contributions from the known point sources would still leave high nutrient inputs, and further reduction in nutrient contributions, including non-point, would probably be necessary to effect lake water quality improvement. Examination of land use practices and identification of additional point sources may provide answers to further nutrient reductions.

2. Nonpoint sources -

Nonpoint sources, including precipitation, contributed 78.5% of the total phosphorus input during the sampling year. The Big Wood River contributed 22.8%, Camas Creek contributed 45.0% and the ungaged minor tributaries and immediate drainage contributed an estimated 4.8%.

The nutrient export rates of Poison Creek were substantially greater during the sampling year than the other gaged tributaries to Magic Reservoir (Section IV-D). These inflated rates may be due to unidentified point sources rather than to nonpoint source inputs, but more extensive sampling would have to be done to determine the location and significance of these possible sources.

II. LAKE AND DRAINAGE BASIN CHARACTERISTICS

Lake and drainage basin characteristics are itemized below. Lake morphometry data were provided by Martin and Hansen (1966) and U.S. Geological Survey (USGS) Water Quality Records (1972). Tributary flow data were provided by the Idaho District Office of the USGS. Outlet drainage area includes the lake surface area. Mean hydraulic retention time was obtained by dividing the lake volume by mean flow of the outlet. Precipitation values are estimated by methods as outlined in National Eutrophication Survey (NES) Working Paper No. 175. A table of metric/English conversions is included as Appendix A.

A. Lake Morphometry:

1. Surface area: 15.80 km^2.
2. Mean depth: 15.0 meters.
3. Maximum depth: ?
4. Volume: 236.213 x 10^6 m^3.
5. Mean hydraulic retention time: 175 days.

B. Tributary and Outlet:
(See Appendix B for flow data)

1. Tributaries -

Name	Drainage area (km^2)	Mean flow (m^3/sec)
A-2 Big Wood River	2,147.1	9.29
C-1 Camas Creek	1,678.3	5.29
D-1 Poison Creek	18.7	0.04
E-1 Rock Creek	105.7	0.32
Minor tributaries and immediate drainage -	178.4	0.48
Totals	4,128.2	15.42
2. Outlet - A-1 Big Wood River	4,144.0	15.66

C. Precipitation:

1. Year of sampling: 30.2 cm.
2. Mean annual: 24.1 cm.

III. LAKE WATER QUALITY SUMMARY

Magic Reservoir was sampled three times during the open-water season of 1975 by means of a pontoon-equipped Huey helicopter. Each time, samples for physical and chemical parameters were collected from three stations on the lake and from a number of depths at each station (see map, page v). During each visit, depth-integrated samples were collected from each station for chlorophyll a analysis and phytoplankton identification and enumeration. During the first and last visits, 18.9-liter depth-integrated samples were composited for algal assays. Maximum depths sampled were 33.5 meters at Station 01, 27.4 meters at Station 02, and 15.2 meters at Station 03. For a more detailed explanation of NES methods, see NES Working Paper No. 175.

The results obtained are presented in full in Appendix C and are summarized in III-A for waters at the surface and at the maximum depth for each site. Results of the phytoplankton counts and chlorophyll a determinations are included in III-B. Results of the limiting nutrient study are presented in III-C.

MAGIC RESERVOIR
STORET CODE 1609

PHYSICAL AND CHEMICAL CHARACTERISTICS

PARAMETER	N*	(5/15/75) S*** = 3 RANGE	MEDIAN	MAX DEPTH RANGE (METERS)	N*	(8/ 5/75) S*** = 3 RANGE	MEDIAN	MAX DEPTH RANGE (METERS)	N*	(9/17/75) S*** = 3 RANGE	MEDIAN	MAX DEPTH RANGE (METERS)
TEMPERATURE (DEG CENT)												
0.-1.5 M DEPTH	6	10.6- 15.5	11.9	0.0- 1.5	6	20.0- 21.2	21.1	0.0- 1.5	6	17.4- 18.3	17.5	0.0- 1.5
MAX DEPTH**	3	5.3- 5.7	5.5	15.2- 33.5	3	11.6- 14.6	12.2	14.6- 31.4	3	13.9- 17.4	15.5	7.0- 24.7
DISSOLVED OXYGEN (MG/L)												
0.-1.5 M DEPTH	6	8.4- 10.0	9.1	0.0- 1.5	6	6.2- 8.2	7.7	0.0- 1.5	6	7.0- 9.0	7.6	0.0- 1.5
MAX DEPTH**	3	8.6- 8.6	8.6	15.2- 33.5	2	0.3- 2.8	1.5	25.9- 31.4	3	0.6- 7.6	1.4	7.0- 24.7
CONDUCTIVITY (UMHOS)												
0.-1.5 M DEPTH	6	122.- 137.	131.	0.0- 1.5	5	166.- 176.	170.	0.0- 1.5	6	181.- 185.	183.	0.0- 1.5
MAX DEPTH**	3	116.- 122.	117.	15.2- 33.5	3	150.- 166.	161.	14.6- 31.4	3	171.- 183.	181.	7.0- 24.7
PH (STANDARD UNITS)												
0.-1.5 M DEPTH	6	7.1- 8.3	8.0	0.0- 1.5	5	8.8- 8.9	8.8	0.0- 1.5	6	8.4- 8.8	8.5	0.0- 1.5
MAX DEPTH**	3	7.5- 7.9	7.5	15.2- 33.5	3	7.4- 8.1	7.7	14.6- 31.4	3	7.6- 8.6	7.7	7.0- 24.7
TOTAL ALKALINITY (MG/L)												
0.-1.5 M DEPTH	6	66.- 90.	81.	0.0- 1.5	6	88.- 95.	94.	0.0- 1.5	6	106.- 116.	115.	0.0- 1.5
MAX DEPTH**	3	85.- 95.	92.	15.2- 33.5	3	96.- 104.	96.	14.6- 31.4	3	103.- 116.	113.	7.0- 24.7
TOTAL P (MG/L)												
0.-1.5 M DEPTH	6	0.083-0.115	0.097	0.0- 1.5	6	0.011-0.024	0.013	0.0- 1.5	6	0.033-0.058	0.038	0.0- 1.5
MAX DEPTH**	3	0.081-0.135	0.084	15.2- 33.5	3	0.027-0.129	0.129	14.6- 31.4	3	0.041-0.289	0.145	7.0- 24.7
DISSOLVED ORTHO P (MG/L)												
0.-1.5 M DEPTH	6	0.025-0.051	0.033	0.0- 1.5	6	0.005-0.013	0.011	0.0- 1.5	6	0.005-0.010	0.006	0.0- 1.5
MAX DEPTH**	3	0.034-0.050	0.044	15.2- 33.5	3	0.021-0.067	0.029	14.6- 31.4	3	0.004-0.165	0.085	7.0- 24.7
NO2+NO3 (MG/L)												
0.-1.5 M DEPTH	6	0.320-0.430	0.385	0.0- 1.5	6	0.020-0.020	0.020	0.0- 1.5	6	0.020-0.020	0.020	0.0- 1.5
MAX DEPTH**	3	0.460-0.500	0.470	15.2- 33.5	3	0.110-0.240	0.200	14.6- 31.4	3	0.020-0.100	0.020	7.0- 24.7
AMMONIA (MG/L)												
0.-1.5 M DEPTH	6	0.040-0.060	0.045	0.0- 1.5	6	0.020-0.030	0.020	0.0- 1.5	6	0.020-0.020	0.020	0.0- 1.5
MAX DEPTH**	3	0.050-0.070	0.060	15.2- 33.5	3	0.050-0.150	0.060	14.6- 31.4	3	0.020-0.330	0.080	7.0- 24.7
KJELDAHL N (MG/L)												
0.-1.5 M DEPTH	6	0.500-1.100	0.700	0.0- 1.5	6	0.200-0.200	0.200	0.0- 1.5	6	0.200-0.400	0.250	0.0- 1.5
MAX DEPTH**	3	0.400-0.600	0.600	15.2- 33.5	3	0.200-0.400	0.300	14.6- 31.4	3	0.200-0.600	0.400	7.0- 24.7
SECCHI DISC (METERS)	3	0.3- 0.9	0.4		3	4.9- 4.9	4.9		2	1.2- 2.7	2.0	

* N = NO. OF SAMPLES
** MAXIMUM DEPTH SAMPLED AT EACH SITE
*** S = NO. OF SITES SAMPLED ON THIS DATE

B. Biological Characteristics:

1. Phytoplankton -

Sampling Date	Dominant Genera	Algal Units per ml
05/15/75	1. Stephanodiscus	4,099
	2. Chroomonas	592
	3. Cryptomonas	42
	Other genera	---
	Total	4,733
08/05/75	1. Chroomonas	132
	2. Cryptomonas	75
	3. Fragilaria	75
	4. Asterionella	56
	5. Anabaena	38
	Other genera	56
	Total	432
09/17/75	1. Aphanizomenon	3,297
	2. Ceratium	230
	3. Chroomonas	153
	4. Melosira	153
	5. Cryptomonas	38
	Other genera	---
	Total	3,871

2. Chlorophyll *a* -

Sampling Date	Station Number	Chlorophyll *a* (µg/l)
05/15/75	01	11.6
	02	2.6
	03	1.3
08/05/75	01	2.1
	02	4.4
	03	2.2
09/17/75	01	27.3
	02	7.2
	03	7.2

C. Limiting Nutrient Study:

1. Autoclaved, filtered, and nutrient spiked -

a. 05/15/75

Spike (mg/l)	Ortho P Conc.(mg/l)	Inorganic N Conc.(mg/l)	Maximum Yield (mg/l-dry wt.)
Control	0.025	0.450	8.3
0.05 P	0.075	0.450	16.5
0.05 P + 1.0 N	0.075	1.450	28.8
1.00 N	0.025	1.450	7.8

b. 09/17/75

Control	0.020	0.070	1.3
0.05 P	0.070	0.070	1.1
0.05 P + 1.0 N	0.070	1.070	15.3
1.00 N	0.020	1.070	2.6

2. Discussion -

The control yields of the assay alga, Selenastrum capricornutum, indicate that the potential primary productivity of Magic Reservoir was high at the time of both sample collections (05/15/75, 09/17/75). In the May assay, a significant increase in yield occurred when phosphorus was added alone and in combination with nitrogen, indicating phosphorus limitation. The addition of only nitrogen resulted in a yield which was not significantly greater than that of the control. In the September assay, the addition of nitrogen alone produced a slight increase in yield over that of the control, suggesting nitrogen limitation at that time. The addition of phosphorus alone did not result in a yield greater than that of the control.

The mean inorganic nitrogen to orthophosphorus (N/P) ratios in the lake data were 13/1, <6/1, and <3/1 in the spring, summer, and fall, respectively, suggesting primary limitation by nitrogen (a mean N/P ratio of 14/1 or greater generally reflects phosphorus limitation).

IV. NUTRIENT LOADINGS
(See Appendix D for data).

For the determination of nutrient loadings, the Idaho National Guard collected monthly near-surface grab samples from each of the tributary sites indicated on the map (page v), except for the high runoff months of June and July when two samples were collected. Sampling was begun in October 1974, and was completed in September, 1975.

Through an interagency agreement, stream flow estimates for the year of sampling and a "normalized" or average year were provided by the Idaho District Office of the USGS for the tributary sites nearest the lake.

In this report, nutrient loads for sampled tributaries were determined by using a modification of a USGS computer program for calculating stream loadings. Nutrient loadings indicated for tributaries are those measured minus known point source loads, if any.

Nutrient loadings for unsampled "minor tributaries and immediate drainage" ("ZZ" of USGS) were estimated by using the mean annual nutrient loads, in $kg/km^2/yr$, in Camas Creek and Rock Creek at Stations C-1 and E-1, and multiplying the means by the ZZ area in km^2.

Monthly chemistry and flow data for the Ketchum and Hailey wastewater treatment plants, and nutrient loads for the Mountain Meadows Mobile Home Park plant were provided by the Idaho Department of Health and Welfare (M. Smith, 1976).

A. Waste Sources:

1. Known municipal -

Name	Pop.* Served	Treatment*	Mean Flow ($m^3/d \times 10^3$)	Receiving Water
Ketchum	2,840†	Extended aeration	4.383	Big Wood River
Hailey	1,450	Extended aeration	1.086	Big Wood River
Mountain Meadows Mobile Home Park	300	Extended aeration	0.114**	Big Wood River

2. Known industrial - None

*M. Smith, 1976.
**Estimated at 0.3785 m^3/capita/day.
†Flow and nutrient loadings from Ketchum - Sun Valley plant also include an estimated 6,260 peak winter nonresidents and 4,440 peak summer nonresidents.

B. Annual Total Phosphorus Loading - Average Year:

1. Inputs -

Source	kg P/yr	% of total
a. Tributaries (nonpoint load) -		
A-2 Big Wood River	9,310	22.8
C-1 Camas Creek	18,335	45.0
D-1 Poison Creek	915	2.3
E-1 Rock Creek	1,180	2.9
b. Minor tributaries and immediate drainage (nonpoint load) -	1,960	4.8
c. Known municipal STP's -		
Ketchum	6,195	15.2
Hailey	2,080	5.1
Mountain Meadows Mobile Home Park	495	1.2
d. Septic tanks* -	5	<0.1
e. Known industrial - None		
f. Direct precipitation** -	275	0.7
Totals	40,750	100.0
2. Output - A-1 Big Wood River	16,845	
3. Net annual P accumulation -	23,905	

*Estimate based on 31 lakeshore residences (summer use only).
**Estimated (see NES Working Paper No. 175).

C. Annual Total Nitrogen Loading - Average Year:

1. Inputs -

Source	kg N/yr	% of total
a. Tributaries (nonpoint load) -		
A-2 Big Wood River	178,555	43.7
C-1 Camas Creek	139,530	34.1
D-1 Poison Creek	11,160	2.7
E-1 Rock Creek	12,485	3.1
b. Minor tributaries and immediate drainage (nonpoint load) -	17,840	4.4
c. Known municipal STP's -		
Ketchum	24,325	5.9
Hailey	7,020	1.7
Mountain Meadows Mobile Home Park	910	0.2
d. Septic tanks* -	110	<0.1
e. Known industrial - None		
f. Direct precipitation** -	17,060	4.2
Totals	408,995	100.0
2. Output - A-1 Big Wood River	359,260	
3. Net annual N accumulation -	49,735	

*Estimate based on 31 lakeshore residences (summer use only).
**Estimated (see NES Working Paper No. 175).

D. Mean Annual Nonpoint Nutrient Export by Subdrainage Area:

Tributary	kg P/km^2/yr	kg N/km^2/yr
Big Wood River	4	83
Camas Creek	11	83
Poison Creek	49	597
Rock Creek	11	118

E. Mean Nutrient Concentrations in Ungaged Streams:

Tributary	Mean Total P (mg/l)	Mean Total N (mg/l)
B-1 Lava Creek	0.053	0.577
F-1 Camp Creek	0.071	0.688

Nutrient levels for these ungaged tributaries to Magic Reservoir are in line with those found in Big Wood River and Camas Creek, but somewhat lower than those found in the other two gaged tributaries to the lake.

F. Yearly Loadings:

In the following table, the existing phosphorus annual loading is compared to the relationship proposed by Vollenweider (1975). Essentially, his "eutrophic" loading is that at which the receiving water would become eutrophic or remain eutrophic; his "oligotrophic" loading is that which would result in the receiving water remaining oligotrophic or becoming oligotrophic if morphometry permitted. A "mesotrophic" loading would be considered one between "eutrophic" and "oligotrophic".

Note that Vollenweider's model may not apply to lakes with short hydraulic retention times or in which light penetration is severely restricted by high concentrations of suspended solids in the surface waters.

	Total Yearly Phosphorus Loading ($g/m^2/yr$)
Estimated loading for Magic Reservoir	2.58
Vollenweider's "eutrophic" loading	1.08
Vollenweider's "oligotrophic" loading	0.54

V. LITERATURE REVIEWED

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VI. APPENDICES

APPENDIX A

CONVERSION FACTORS

CONVERSION FACTORS

Hectares x 2.471 = acres

Kilometers x 0.6214 = miles

Meters x 3.281 = feet

Cubic meters x 8.107×10^{-4} = acre/feet

Square kilometers x 0.3861 = square miles

Cubic meters/sec x 35.315 = cubic feet/sec

Centimeters x 0.3937 = inches

Kilograms x 2.205 = pounds

Kilograms/square kilometer x 5.711 = lbs/square mile

APPENDIX B

TRIBUTARY FLOW DATA

TRIBUTARY FLOW INFORMATION FOR IDAHO 08/23/76

LAKE CODE 1609 MAGIC RES.

TOTAL DRAINAGE AREA OF LAKE(SQ KM) 4144.0

TRIBUTARY	SUB-DRAINAGE AREA(SQ KM)	NORMALIZED FLOWS(CMS) JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	MEAN
1609A1	4144.0	2.52	2.75	8.16	22.06	38.79	43.32	27.95	21.07	16.00	2.10	1.64	0.99	15.66
1609A2	2147.1	2.29	2.63	3.91	12.88	26.22	34.55	12.69	3.57	3.17	3.28	3.40	2.75	9.29
1609C1	1678.3	0.93	2.94	6.63	33.13	12.32	4.73	0.82	0.20	0.17	0.31	0.54	1.13	5.29
1609D1	18.7	0.003	0.017	0.057	0.227	0.085	0.028	0.003	0.0	0.0	0.0	0.0	0.006	0.035
1609E1	105.7	0.23	0.34	0.45	0.85	0.57	0.40	0.20	0.11	0.11	0.14	0.17	0.23	0.32
160927	194.2	0.23	0.40	0.71	1.95	0.96	0.51	0.20	0.11	0.11	0.14	0.17	0.23	0.48

SUMMARY

TOTAL DRAINAGE AREA OF LAKE = 4144.0
SUM OF SUB-DRAINAGE AREAS = 4144.1
TOTAL FLOW IN = 185.14
TOTAL FLOW OUT = 187.34

MEAN MONTHLY FLOWS AND DAILY FLOWS(CMS)

TRIBUTARY	MONTH	YEAR	MEAN FLOW	DAY	FLOW	DAY	FLOW	DAY	FLOW
1609A1	10	74	4.134	19	0.244				
	11	74	1.472	16	2.945				
	12	74	0.204	14	0.195				
	1	75	0.195	18	0.195				
	2	75	0.207	17	0.207				
	3	75	0.227	15	0.218				
	4	75	25.598	12	40.776				
	5	75	41.258	17	102.507				
	6	75	58.531	7	79.004	21	45.873		
	7	75	44.911	5	63.430	19	30.582		
	8	75	28.798	14	30.582				
	9	75	21.776	20	21.577				
1609A2	10	74	3.030	19	2.294				
	11	74	3.766	16	3.483				
	12	74	2.917	14	3.115				
	1	75	1.699	18	1.699				
	2	75	1.699	17	1.812				
	3	75	2.464	15	2.379				
	4	75	4.474	12	3.058				
	5	75	23.361	17	43.891				
	6	75	40.550	7	64.846	21	28.883		
	7	75	37.548	5	51.253	19	35.396		
	8	75	5.918	14	6.456				
	9	75	2.435	20	2.350				

TRIBUTARY FLOW INFORMATION FOR IDAHO 08/23/76

LAKE CODE 1609 MAGIC RES.

MEAN MONTHLY FLOWS AND DAILY FLOWS(CMS)

TRIBUTARY	MONTH	YEAR	MEAN FLOW	DAY	FLOW	DAY	FLOW	DAY	FLOW
1609C1	10	74	0.249	19	0.224				
	11	74	0.566	16	0.680				
	12	74	0.566	14	0.566				
	1	75	0.566	18	0.651				
	2	75	0.793	17	0.765				
	3	75	1.557	15	1.388				
	4	75	21.776	12	2.492				
	5	75	41.484	17	47.572				
	6	75	8.099	7	10.336	21	5.947		
	7	75	2.633	5	4.106	19	7.221		
	8	75	0.241	14	0.156				
	9	75	0.269	20	0.340				
1609D1	10	74	0.0	19	0.0				
	11	74	0.0	16	0.0				
	12	74	0.0	14	0.0				
	1	75	0.0	18	0.0				
	2	75	0.0	17	0.0				
	3	75	0.008	15	0.006				
	4	75	0.147	12	0.014				
	5	75	0.280	19	0.252				
	6	75	0.054	7	0.068	21	0.040		
	7	75	0.017	5	0.025				
	8	75	0.0	10	0.0	14	0.0		
	9	75	0.0	20	0.0				
1609E1	10	74	0.127	19	0.125				
	11	74	0.176	16	0.190				
	12	74	0.176	14	0.176				
	1	75	0.176	18	0.187				
	2	75	0.198	17	0.198				
	3	75	0.261	15	0.249				
	4	75	0.708	12	0.311				
	5	75	0.906	17	0.963				
	6	75	0.481	7	0.538	21	0.425		
	7	75	0.311	5	0.368	19	0.311		
	8	75	0.127	14	0.108				
	9	75	0.133	20	0.144				

42

APPENDIX C

PHYSICAL AND CHEMICAL DATA

STORET RETRIEVAL DATE 76/08/25
NATL EUTROPHICATION SURVEY
EPA-LAS VEGAS

160903
43 18 42.0 114 23 37.0 3
MAGIC RESERVOIR
16013 IDAHO

130691

11EPALES 2111202
0055 FEET DEPTH CLASS 00

DATE FROM TO	TIME OF DAY	DEPTH FEET	00010 WATER TEMP CENT	00300 DO MG/L	00077 TRANSP SECCHI INCHES	00094 CNDUCTVY FIELD MICROMHO	00400 PH SU	00410 T ALK CACO3 MG/L	00610 NH3-N TOTAL MG/L	00625 TOT KJEL N MG/L	00630 NO2&NO3 N-TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P
75/05/15	15 10	0000	15.5	8.8	12	133	8.00	66	0.060	0.900	0.320	0.035
	15 10	0005	10.6	8.4		137	7.90	82	0.050	0.600	0.380	0.032
	15 10	0015	7.4	8.8		118	7.60	82	0.040	0.400	0.480	0.035
	15 10	0030	6.1	9.2		117	7.80	83	0.030	0.400	0.500	0.034
	15 10	0050	5.7	8.6		117	7.50	85	0.050	0.400	0.500	0.034
75/08/05	07 45	0000	21.1	7.4	192	168		93	0.030	0.200K	0.020K	0.013
	07 45	0005	21.2	7.4			8.90	94	0.020	0.200K	0.020K	0.011
	07 45	0015	20.6	7.2		171	8.90	94	0.020	0.200K	0.020K	0.011
	07 45	0030	16.9	5.8		195	8.20	111	0.040	0.200K	0.060	0.018
	07 45	0048	14.6			166	8.10	104	0.050	0.200K	0.110	0.021
75/09/17	10 55	0000	17.4	7.6	108	183	8.40	115	0.020K	0.400	0.020K	0.010
	10 55	0005	17.4	7.6		185	8.50	116	0.020K	0.400	0.020K	0.006
	10 55	0015	17.5	7.8		187	8.60	117	0.020K	0.200	0.020K	0.005
	10 55	0023	17.4	7.6		183	8.60	116	0.020K	0.200K	0.020K	0.004

DATE FROM TO	TIME OF DAY	DEPTH FEET	00665 PHOS-TOT MG/L P	32217 CHLRPHYL A UG/L	00031 INCDT LT REMNING PERCENT
75/05/15	15 10	0000	0.115	1.3	
	15 10	0005	0.096		
	15 10	0015	0.082		
	15 10	0030	0.083		
	15 10	0050	0.081		
75/08/05	07 45	0000	0.013	2.2	
	07 45	0005	0.011		
	07 45	0015	0.013		
	07 45	0030	0.027		
	07 45	0048	0.027		
75/09/17	10 55	0000	0.033	7.2	
	10 55	0005	0.033		
	10 55	0015	0.038		
	10 55	0023	0.041		

K VALUE KNOWN TO BE LESS
THAN INDICATED

STORET RETRIEVAL DATE 76/08/25
NATL EUTROPHICATION SURVEY
EPA-LAS VEGAS

160901
43 15 28.0 114 21 27.0 3
MAGIC RESERVOIR
16013 IDAHO

130691

11EPALES 2111202
0114 FEET DEPTH CLASS 00

DATE FROM TO	TIME OF DAY	DEPTH FEET	00010 WATER TEMP CENT	00300 DO MG/L	00077 TRANSP SECCHI INCHES	00094 CNDUCTVY FIELD MICROMHO	00400 PH SU	00410 T ALK CACO3 MG/L	00610 NH3-N TOTAL MG/L	00625 TOT KJEL N MG/L	00630 NO2&NO3 N-TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P
75/05/15	14 00	0000	12.3	9.3	36	132	8.30	90	0.060	1.100	0.370	0.027
	14 00	0005	11.1	10.0		129	8.10	87	0.040	0.600	0.420	0.025
	14 00	0015	9.8	10.2		129	8.00	90	0.030	0.600	0.410	0.034
	14 00	0025	8.1	9.6		126	7.50	91	0.040	0.500	0.430	0.026
	14 00	0050	6.1	9.2		121	8.00	91	0.040	0.400	0.470	0.051
	14 00	0080	5.8	8.8		121	7.30	93	0.040	0.400	0.470	0.045
	14 00	0110	5.5	8.6		122	7.90	92	0.070	0.600	0.460	0.050
75/08/05	08 45	0000	21.2	8.0	192	166	8.80	88	0.030	0.200	0.020	0.008
	08 45	0005	21.1	6.2		170	8.80	88	0.020	0.200	0.020K	0.005
	08 45	0020	20.6	6.4		166	8.00	89	0.030	0.200K	0.020K	0.004
	08 45	0035	16.8	6.2		171	8.00	91	0.020	0.200	0.040	0.006
	08 45	0055	14.0	4.6		161	7.80	91	0.020	0.200K	0.180	0.020
	08 45	0075	12.8	0.6		162	7.50	94	0.150	0.400	0.200	0.063
	08 45	0103	11.6	0.3		161	7.40	96	0.150	0.400	0.200	0.067
75/09/17	11 20	0000	18.3	8.6	48	183	8.80	114	0.020K	0.200K	0.020K	0.005
	11 20	0005	18.3	9.0		181	8.85	115	0.020K	0.200	0.020K	0.007
	11 20	0015	18.3	8.6		183	8.85	115	0.020K	0.600	0.020K	0.006
	11 20	0030	18.3	9.0		183	8.90	100	0.020K	0.400	0.020K	0.014
	11 20	0050	18.2	9.0		183	8.55	100	0.050	0.600	0.020K	0.030
	11 20	0081	13.9	0.6		171	7.70	103	0.330	0.600	0.020K	0.165

K VALUE KNOWN TO BE LESS
THAN INDICATED

STORET RETRIEVAL DATE 76/08/25
NATL EUTROPHICATION SURVEY
EPA-LAS VEGAS

160901
43 15 28.0 114 21 27.0 3
MAGIC RESERVOIR
16013 IDAHO

13069

11EPALES 2111202
0114 FEET DEPTH CLASS 00

DATE FROM TO	TIME OF DAY	DEPTH FEET	00665 PHOS-TOT MG/L P	32217 CHLRPHYL A UG/L	00031 INCDT LT REMNING PERCENT
75/05/15	14 00	0000	0.098	11.6	
	14 00	0005	0.083		
	14 00	0015	0.076		
	14 00	0025	0.075		
	14 00	0050	0.075		
	14 00	0080	0.076		
	14 00	0110	0.135		
75/08/05	08 45	0000	0.024	2.1	
	08 45	0005	0.021		
	08 45	0020	0.018		
	08 45	0035	0.032		
	08 45	0055	0.039		
	08 45	0075	0.119		
	08 45	0103	0.129		
75/09/17	11 20	0000	0.053	27.3	
	11 20	0005	0.058		
	11 20	0015	0.050		
	11 20	0030	0.066		
	11 20	0050	0.089		
	11 20	0081	0.289		

STORET RETRIEVAL DATE 76/08/25
NATL EUTROPHICATION SURVEY
EPA-LAS VEGAS

160902
43 17 05.0 114 22 28.0 3
MAGIC RESERVOIR
16013 IDAHO

130691

11EPALES 2111202
0094 FEET DEPTH CLASS 00

DATE FROM TO	TIME OF DAY	DEPTH FEET	00010 WATER TEMP CENT	00300 DO MG/L	00077 TRANSP SECCHI INCHES	00094 CNDUCTVY FIELD MICROMHO	00400 PH SU	00410 T ALK CACO3 MG/L	00610 NH3-N TOTAL MG/L	00625 TOT KJEL N MG/L	00630 NO2&NO3 N-TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P
75/05/15	14 35	0000	11.6	9.6	14	122	8.00	72	0.040	0.800	0.390	0.048
	14 35	0005	12.8	8.9		126	7.10	79	0.040	0.500	0.430	0.051
	14 35	0015	9.5	9.0		120	7.70	88	0.040	0.500	0.490	0.034
	14 35	0030	6.1	9.2		118	7.50	92	0.050	0.500	0.500	0.033
	14 35	0060	5.5	9.2		117	7.40	92	0.040	0.500	0.480	0.034
	14 35	0090	5.3	8.6		116	7.50	95	0.060	0.600	0.470	0.044
75/08/05	08 20	0000	21.1	8.0	192	176	8.80	94	0.020	0.200K	0.020K	0.011
	08 20	0005	20.0	8.2		172	8.80	95	0.020	0.200K	0.020K	0.011
	08 20	0015	20.9	7.8		172	8.70	96	0.030	0.200K	0.020K	0.011
	08 20	0033	17.0	6.0		164	8.00	104	0.030	0.200K	0.020	0.013
	08 20	0055	14.1	3.0		152	7.70	95	0.050	0.200	0.180	0.024
	08 20	0085	12.2	2.8		150	7.70	96	0.060	0.300	0.240	0.029
75/09/17	09 50	0000	17.6	7.2		183	8.40	106	0.020K	0.200	0.020K	0.006
	09 50	0005	17.5	7.0		183	8.50	109	0.020K	0.300	0.020K	0.005
	09 50	0015	17.6	7.2		183	8.50	110	0.020K	0.200	0.020K	0.005
	09 50	0030	17.5	7.2		183	8.45	111	0.020K	0.200	0.020K	0.006
	09 50	0045	17.0	6.0		189	8.15	114	0.020K	0.200	0.040	0.014
	09 50	0068	15.5	1.4		181	7.65	113	0.080	0.400	0.100	0.085

DATE FROM TO	TIME OF DAY	DEPTH FEET	00665 PHOS-TOT MG/L P	32217 CHLRPHYL A UG/L	00031 INCDT LT REMNING PERCENT
75/05/15	14 35	0000	0.103	2.6	
	14 35	0005	0.099		
	14 35	0015	0.079		
	14 35	0030	0.076		
	14 35	0060	0.076		
	14 35	0090	0.084		
75/08/05	08 20	0000	0.014	4.4	
	08 20	0005	0.011		
	08 20	0015	0.017		
	08 20	0033	0.020		
	08 20	0055	0.108		
	08 20	0085	0.129		
75/09/17	09 50	0000	0.039	7.2	
	09 50	0005	0.038		
	09 50	0015	0.040		
	09 50	0030	0.033		
	09 50	0045	0.044		
	09 50	0068	0.145		

K VALUE KNOWN TO BE LESS THAN INDICATED

STORET RETRIEVAL DATE 76/08/25
NATL EUTROPHICATION SURVEY
EPA-LAS VEGAS

160903
43 18 42.0 114 23 37.0 3
MAGIC RESERVOIR
16013 IDAHO

130691

11EPALES 2111202
0055 FEET DEPTH CLASS 00

DATE FROM TO	TIME OF DAY	DEPTH FEET	00010 WATER TEMP CENT	00300 DO MG/L	00077 TRANSP SECCHI INCHES	00094 CNDUCTVY FIELD MICROMHO	00400 PH SU	00410 T ALK CACO3 MG/L	00610 NH3-N TOTAL MG/L	00625 TOT KJEL N MG/L	00630 NO2&NO3 N-TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P
75/05/15	15 10	0000	15.5	8.8	12	133	8.00	66	0.060	0.900	0.320	0.035
	15 10	0005	10.6	8.4		137	7.90	82	0.050	0.600	0.380	0.032
	15 10	0015	7.4	8.8		118	7.60	82	0.040	0.400	0.480	0.035
	15 10	0030	6.1	9.2		117	7.80	83	0.030	0.400	0.500	0.034
	15 10	0050	5.7	8.6		117	7.50	85	0.050	0.400	0.500	0.034
75/08/05	07 45	0000	21.1	7.4	192	168		93	0.030	0.200K	0.020K	0.013
	07 45	0005	21.2	7.4			8.90	94	0.020	0.200K	0.020K	0.011
	07 45	0015	20.6	7.2		171	8.90	94	0.020	0.200K	0.020K	0.011
	07 45	0030	16.9	5.8		195	8.20	111	0.040	0.200K	0.060	0.018
	07 45	0048	14.6			166	8.10	104	0.050	0.200K	0.110	0.021
75/09/17	10 55	0000	17.4	7.6	108	183	8.40	115	0.020K	0.400	0.020K	0.010
	10 55	0005	17.4	7.6		185	8.50	116	0.020K	0.400	0.020K	0.006
	10 55	0015	17.5	7.8		187	8.60	117	0.020K	0.200	0.020K	0.005
	10 55	0023	17.4	7.6		183	8.60	116	0.020K	0.200K	0.020K	0.004

DATE FROM TO	TIME OF DAY	DEPTH FEET	00665 PHOS-TOT MG/L P	32217 CHLRPHYL A UG/L	00031 INCDT LT REMNING PERCENT
75/05/15	15 10	0000	0.115	1.3	
	15 10	0005	0.096		
	15 10	0015	0.082		
	15 10	0030	0.083		
	15 10	0050	0.081		
75/08/05	07 45	0000	0.013	2.2	
	07 45	0005	0.011		
	07 45	0015	0.013		
	07 45	0030	0.027		
	07 45	0048	0.027		
75/09/17	10 55	0000	0.033	7.2	
	10 55	0005	0.033		
	10 55	0015	0.038		
	10 55	0023	0.041		

K VALUE KNOWN TO BE LESS
THAN INDICATED

APPENDIX D

TRIBUTARY AND WASTEWATER TREATMENT PLANT DATA

STORET RETRIEVAL DATE 76/08/25
NATL EUTROPHICATION SURVEY
EPA- LAS VEGAS

1609A1
43 15 05.0 114 21 30.0 4
BIG WOOD RIVER
16 15 BELLEVUE
O/MAGIC RESERVOIR 130691
BNK BELO MAGIC DAM ON DRT RD
11EPALES 2111204
0000 FEET DEPTH CLASS 00

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
75/04/12			0.105	1.000	0.025	0.015	0.020
75/05/17			0.315	0.450	0.015	0.020	0.050
75/06/07			0.280	0.737	0.030	0.025	0.045
75/06/21	10 45		0.005	0.700	0.020	0.005	0.030
75/07/05	13 30		0.005	0.500	0.015	0.010	0.030
75/07/19	08 00		0.005	0.900	0.025	0.007	0.020
75/08/14	17 30		0.110	0.250	0.015	0.020	0.030
75/09/20	12 30		0.035	0.600	0.045	0.015	0.040

STORET RETRIEVAL DATE 76/08/25
NATL EUTROPHICATION SURVEY
EPA- LAS VEGAS

1609A2
43 19 45.0 114 21 30.0 4
BIG WOOD RIVER
16 15 BELLEVUE
T/MAGIC RESERVOIR 130691
SWNGING BRDG 600 FT S OF RT 68 JCT
11EPALES 2111204
0000 FEET DEPTH CLASS 00

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
74/10/19	09	10	0.112	0.500	0.015	0.005	0.015
74/11/16	10	00	0.088	0.300	0.010	0.005	0.010K
74/12/14	12	30	0.168	0.200	0.025	0.010	0.020
75/01/18	11	45	0.280	0.500	0.020	0.015	0.015
75/02/17	16	00	0.272	0.900	0.024	0.008	0.020
75/03/15	11	15	0.280	0.300	0.050	0.010	0.030
75/04/12			0.180	1.300	0.125	0.015	0.030
75/05/17			0.315	0.600	0.025	0.040	0.060
75/06/07			0.160		0.030	0.030	
75/06/21	13	30	0.150	0.300	0.020	0.015	0.080
75/07/05	11	31	0.105	0.475	0.020	0.020	0.140
75/07/19	11	00	0.145	0.850	0.025	0.015	0.040
75/08/14	18	30	0.065	0.350	0.015	0.010	0.070
75/09/20	10	00	0.055	0.100	0.015	0.010	0.070

K VALUE KNOWN TO BE LESS THAN INDICATED

STORET RETRIEVAL DATE 76/08/25
NATL EUTROPHICATION SURVEY
EPA- LAS VEGAS

160981
43 17 45.0 114 26 00.0 4
LAVA CREEK
16 15 BELLEVUE
T/MAGIC RESERVOIR 130691
UNMPRVD RD XING 2.5 M NW OF MAGIC RESORT
11EPALES 2111204
0000 FEET DEPTH CLASS 00

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
75/03/15	08	30	0.020	0.500	0.020	0.065	0.100
75/05/17			0.005		0.015	0.045	
75/06/07			0.005	0.450	0.020	0.010	0.040
75/06/21	11	30	0.005	0.750	0.020	0.010	0.020

STORET RETRIEVAL DATE 76/08/25
NATL EUTROPHICATION SURVEY
EPA- LAS VEGAS

1609C1
43 19 59.0 114 32 27.0 4
CAMUS CREEK
16 15 BLAINE
T/MAGIC RESERVOIR 130692
MACON SHEEP BRDG END RD .8 M S HWY 68 JT
11EPALES 2111204
0000 FEET DEPTH CLASS 00

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
74/10/19	11 00		1.560	0.300	0.055	0.025	0.035
74/11/16	09 00		0.600	0.200	0.010	0.020	0.030
74/12/14	13 30		0.736	0.800	0.055	0.030	0.070
75/01/18	10 45		0.820	0.500	0.113	0.035	0.040
75/02/17	10 00		0.820	1.200	0.128	0.080	0.098
75/03/15	10 15		0.450	0.350	0.050	0.050	0.080
75/04/12			0.350	2.200	0.090	0.045	0.080
75/05/17			0.220	0.350	0.040	0.050	0.100
75/06/07			0.115	1.200	0.030	0.045	0.230
75/06/21	09 00		0.170	0.650	0.030	0.035	0.070
75/07/05	12 00		0.180	0.500	0.015	0.045	0.070
75/07/19	09 00		0.230	0.400	0.010	0.035	0.060
75/08/14	17 45		1.720	1.200	0.015	0.025	0.060
75/09/20			1.250	0.300	0.020	0.020	0.050

STORET RETRIEVAL DATE 76/06/25
NATL EUTROPHICATION SURVEY
EPA- LAS VEGAS

160901
43 20 38.0 114 25 00.0 4
POISON CREEK
16 15 BELLEVUE
T/MAGIC RESERVOIR 130691
UNMPRVD RD XING 1 MI NW HOT SPRNGS LNDNG
11EPALES 2111204
0000 FEET DEPTH CLASS 00

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
75/03/15	10 45		0.115	0.200	0.010	0.045	0.050
75/04/12			0.260	1.600	0.113	0.115	0.160
75/05/19			0.195	0.900	0.035	0.060	0.080
75/06/07			0.025	0.550	0.020	0.055	0.100
75/06/21	12 00		0.015	0.450	0.030	0.045	0.050
75/07/05	09 20		0.020	0.650	0.025	0.070	0.110

STORET RETRIEVAL DATE 76/08/25
NATL EUTROPHICATION SURVEY
EPA- LAS VEGAS

1609E1
43 20 05.0 114 21 30.0 4
ROCK CREEK
16 15 BELLEVUE
T/MAGIC RESERVOIR 130691
RT 68 BRDG 5.3 MI W OF RT 93 JCT
11EPALES 2111204
0000 FEET DEPTH CLASS 00

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
74/10/19	09	35	0.088	0.200	0.015	0.015	0.025
74/11/16	09	45	0.480	0.300	0.010	0.040	0.040
74/12/14	14	10	0.650	0.400	0.020	0.035	0.070
75/01/18	11	30	0.600	0.400	0.035	0.040	0.080
75/02/17	10	30	0.504	0.900	0.032	0.040	0.050
75/03/15	11	00	0.375	0.400	0.010	0.045	0.100
75/04/12			0.450	1.700	0.100	0.055	0.260
75/05/17			0.550	0.400	0.015	0.065	0.110
75/06/07			0.260	1.100	0.030	0.080	0.120
75/06/21	12	01	0.230	1.050	0.025	0.055	0.080
75/07/05	14	30	0.430	0.800	0.035	0.090	0.120
75/07/19	10	00	0.170	1.550	0.030	0.085	0.130
75/08/14	18	30	0.035	0.800	0.015	0.055	0.080
75/09/20	10	30	0.120	1.300	0.135	0.065	0.090

STORET RETRIEVAL DATE 76/08/25
NATL EUTROPHICATION SURVEY
EPA- LAS VEGAS

1609F1
43 30 23.0 114 28 35.0 4
CAMP CREEK
16 15 BELLEVUE
T/MAGIC RESERVOIR 130691
HWY 68 BRDG 10 MI W OF US HWY 93 JCT
11EPALES 2111204
0000 FEET DEPTH CLASS 00

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
74/10/19	10 40		0.184	0.400	0.035	0.037	0.070
74/11/16	09 15		0.152	0.300	0.015	0.040	0.040
74/12/14	13 45		0.168	0.400	0.020	0.030	0.050
75/01/18	10 30		0.144	0.700	0.025	0.035	
75/02/17	11 30		0.136	0.300	0.024	0.032	0.078
75/03/15	10 00		0.140	0.300	0.010	0.030	0.060
75/04/12			0.125	1.300	0.040		
75/05/17			0.390	1.500	0.020	0.050	
75/06/07			0.055	0.800	0.025	0.055	0.090
75/06/21	14 00		0.035	0.300	0.030	0.045	0.070
75/07/05	10 02		0.020	0.450	0.015	0.085	0.100
75/07/19	12 00		0.035	0.400	0.015	0.060	0.070
75/08/14	19 00		0.050	0.425	0.015	0.055	0.092
75/09/20	11 00		0.120	0.300	0.060	0.040	0.060

APPENDIX E

PARAMETRIC RANKINGS OF LAKES SAMPLED BY NES IN 1975

STATE OF IDAHO

Mean or median values for six of the key parameters evaluated in establishing the trophic conditions of Idaho lakes sampled are presented to allow direct comparison of the ranking, by parameter, of each lake relative to the others. Median total phosphorus, median inorganic nitrogen and median dissolved orthophosphorus levels are expressed in mg/l. Chlorophyll *a* values are expressed in µg/l. To maintain consistent rank order with the preceding parameters, the mean Secchi disc depth, in inches, is subtracted from 500. Similarly, minimum dissolved oxygen values are subtracted from 15 to create table entries.

LAKE DATA TO BE USED IN RANKINGS

LAKE CODE	LAKE NAME	MEDIAN TOTAL P	MEDIAN INORG N	500-MEAN SEC	MEAN CHLORA	15-MIN DO	MEDIAN DISS ORTHO P
1601	AMERICAN FALLS RESERVOIR	0.105	0.080	463.800	15.379	14.700	0.035
1602	CASCADE LAKE	0.032	0.060	415.067	8.081	14.800	0.009
1603	LAKE COEUR D'ALENE	0.017	0.040	380.348	10.391	12.200	0.005
1604	DWORSHAK RESERVOIR	0.010	0.080	401.866	2.420	7.400	0.009
1605	HAUSER	0.028	0.075	366.286	11.112	14.800	0.013
1606	HAYDEN LAKE	0.010	0.040	243.500	2.787	11.800	0.003
1607	ISLAND PARK RESERVOIR	0.034	0.050	391.778	9.322	12.800	0.012
1608	LAKE LOWELL	0.070	0.070	477.111	25.389	14.600	0.015
1609	MAGIC RESERVOIR	0.062	0.130	400.750	7.322	14.700	0.020
1610	PALISADES RESERVOIR	0.024	0.080	345.428	2.067	12.800	0.007
1611	LOWER PAYETTE	0.013	0.060	234.000	4.600	9.600	0.007
1612	LOWER TWIN LAKES	0.016	0.050	370.000	2.318	13.600	0.009
1613	UPPER TWIN LAKES	0.017	0.045	369.143	4.986	8.200	0.004

PERCENT OF LAKES WITH HIGHER VALUES (NUMBER OF LAKES WITH HIGHER VALUES)

LAKE CODE	LAKE NAME	MEDIAN TOTAL P	MEDIAN INORG N	500-MEAN SEC	MEAN CHLORA	15-MIN DO	MEDIAN DISS ORTHO P
1601	AMERICAN FALLS RESERVOIR	0 (0)	17 (1)	8 (1)	8 (1)	21 (2)	0 (0)
1602	CASCADE LAKE	33 (4)	54 (6)	17 (2)	42 (5)	4 (0)	50 (5)
1603	LAKE COEUR D'ALENE	67 (8)	96 (11)	50 (6)	25 (3)	67 (8)	83 (10)
1604	DWORSHAK RESERVOIR	96 (11)	17 (1)	25 (3)	83 (10)	100 (12)	50 (5)
1605	HAUSER	42 (5)	33 (4)	75 (9)	17 (2)	4 (0)	25 (3)
1606	HAYDEN LAKE	96 (11)	96 (11)	92 (11)	75 (9)	75 (9)	100 (12)
1607	ISLAND PARK RESERVOIR	25 (3)	71 (8)	42 (5)	33 (4)	54 (6)	33 (4)
1608	LAKE LOWELL	8 (1)	42 (5)	0 (0)	0 (0)	33 (4)	17 (2)
1609	MAGIC RESERVOIR	17 (2)	0 (0)	33 (4)	50 (6)	21 (2)	8 (1)
1610	PALISADES RESERVOIR	50 (6)	17 (1)	83 (10)	100 (12)	54 (6)	75 (9)
1611	LOWER PAYETTE	83 (10)	54 (6)	100 (12)	67 (8)	83 (10)	67 (8)
1612	LOWER TWIN LAKES	75 (9)	71 (8)	58 (7)	92 (11)	42 (5)	50 (5)
1613	UPPER TWIN LAKES	58 (7)	83 (10)	67 (8)	58 (7)	92 (11)	92 (11)